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EXAMINER

TSAI, HENRY

ART UNIT PAPER NUMBER

2183

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/728,962

Applicant(s)

MARR ET AL.

Examiner

Henry W.H. Tsai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/8/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/8/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _. | 6) <input type="checkbox"/> Other: _____. |

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DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims **34-49** been renumbered as claims **21-36** respectively.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 21-36 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8, and 11-18 of U.S. Patent No. 6,671,795. Although the conflicting claims are not identical, they are not patentably distinct from each other.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent except, such as, the instant application comprising "pausing the processing of instructions of the first thread at the pipeline stage" in claim 21 (claims 26, 29, and 34 recite the similar limitation) comparing with "preventing instructions of the first thread from being processed for execution" in claim 1 (claims 6, 11, and 16 recite the similar limitation) of the patent. However, It is obvious that "pausing the processing" is an obvious variation in meaning of "preventing ... from being processed". Further, having instructions being processed in a pipeline is well known in the art.

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Drawings

3. The drawings are objected to because in Fig. 4, "461" should read -61-. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

at page 1, "CROSS REFERENCE TO RELATED APPLICATIONS" is not updated; and

at page 8, line 2, "21determines" should read -21 determines-.

Appropriate correction is required.

Claim Objections

5. Claims 21-36 are objected to because of the following informalities: In claim 21, line 7, it is not clear what is mean by "in responsive to said first instruction". Note the first instruction is not an event or an operation. Appropriate correction is required. It is suggested that in claim 21, line 7, after "to", "retirement of" be inserted. Similar problems exist in the other claims 26, 29, and 34.

Appropriate correction is required.

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Claim Rejections - 35 USC § 112

6. Claims 24 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 24, line 2, it is not clear which microinstruction is referred to by "said microinstruction" since there are more than one microinstruction mentioned in claim 22 previously. Should "said microinstruction" read -said second microinstruction-- ? Note at page 7, lines 8-19 in the specification, it is mentioned that if the bit flag is not set(reset), then READ instruction(second microinstruction) is placed into the pipeline for execution.

Applicant is required to review the claims and correct all language which does not comply with 35 U.S.C. § 112, second paragraph.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 21-25, and 29-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Emer et al. (USA 6,493,741) (Herein referred as Emer et al.).

Referring to claim 21, Emer et al. discloses the claimed invention comprising the steps of:

determining whether a first instruction (QUIESCE 117, Fig. 2, and Col. 5, lines 34-35) for a first thread is an instruction of a first type at a pipeline stage of a processor (see Col. 4, lines 15-8 regarding the program instruction propagating into the pipeline);

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pausing processing of instructions of said first thread
(Col. 5, lines 35-36, and Col. 7, lines 33-36 regarding halting
the execution of the thread) at said pipeline stage for a period
of time (note the Emer et al.'s system also uses a timer 107,
see Fig. 8, Col. 5, lines 63-64, and Col. 6, lines 9-11) if said
first instruction is of a first type while processing
instructions from a second thread (see Col. 4, lines 32-34
regarding allowing other executing programs to utilize available
resources when the first thread is paused); and

resuming processing (see Col. 9, lines 17-21 regarding
resuming the processing) of instruction of said first thread
responsive to said first instruction (QUIESCE 117, Fig. 2, see
also Col. 5, lines 34-35) at said pipeline stage.

Note the limitations of claim 21, as set forth above,
comprise the claimed limitations described in claim 29.

As to claim 22, Emer et al. inherently taught: decoding
said first instruction (QUIESCE 117, Fig. 2, Col. 5, lines 34-
35) into a first microinstruction and a second microinstruction
(since a decode unit inherently exists in the Emer et al.'s CPU;
and an instruction is inherently decoded into several
microinstructions in the Emer et al.'s system). Note the
limitations of claim 22, as set forth above, comprise the
claimed limitations described in claim 30.

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As to claim 23, Emer et al. explicitly taught: said first microinstruction causes a value (inside the watch flag indication 105, see Col. 5, lines 59-60) to be stored in memory (the register of watch flag indication 105, Fig. 2) for said first thread. Note the limitations of claim 23, as set forth above, comprise the claimed limitations described in claim 31.

Referring to claim 24, Emer et al. explicitly taught: processing said microinstruction for execution when said value (watch flag 105) stored in memory is reset (see Col. 7, lines 37-38, regarding when the watch flag is cleared). Note the limitations of claim 24, as set forth above, comprise the claimed limitations described in claim 32.

Referring to claim 25, Emer et al. explicitly taught: said value stored in memory value (watch flag 105) is reset when said first microinstruction is retired. Note "said first microinstruction is retired" is given broadest reasonable interpretation as the QUIESCE instruction (Fig. 2, Col. 5, line 34-35) is terminated by an interrupt as mentioned in Col. 9, lines 18-20. Note claim 33 recites the similar limitations as set forth. The interrupt servicing routine (see Col. 9, lines 18-20) is best reasonably and broadly interpreted as a retire unit as claimed.

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Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 26-28, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emer et al.

Referring to claims 26-28, Emer et al. discloses the claimed invention except for: initiating a counter; and pausing processing of instructions of said first thread at a pipeline stage of a processor until said counter reaches a predetermined value while processing instructions for a second thread; and the first instruction including an operand and the initiating including loading the counter with the operand (in Claims 26-28 and claims 34-36 recite the similar limitations.)

However, Emer et al., as set forth above, using a timer (107, Fig. 2) to pause processing of instructions of said first thread (see Fig. 8, Col. 5, lines 63-64, and Col. 6, lines 9-11).

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Further, using a counter to control the time during a process in a computer system; and loading the counter with the operand to flexibly control the length of time are well known in the art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Emer et al.'s system to comprise initiating a counter; pausing processing of instructions of said first thread at a pipeline stage of a processor until said counter reaches a predetermined value while processing instructions for a second thread; and the first instruction including an operand and the initiating including loading the counter with the operand since using the counter is just an alternative way to flexibly control the length of time as comparing with the timer used in the Emer et al.'s system.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited references: Borkenhagen et al,157 discloses a method and apparatus to force a thread switch in a multithreaded processor. Each thread has a corresponding state in a thread state register

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depending on its execution status. The thread switch logic contains a thread switch control register to store the conditions upon which a thread will occur. The thread switch logic has a time-out register which forces a thread switch when execution of the active thread in the multithreaded processor exceeds a programmable period of time. Thread switch logic also is responsive to a software manager capable of changing the priority of the different threads and thus superseding thread switch events.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Henry Tsai whose telephone number is (571) 272-4176. The examiner can normally be reached on Monday-Thursday from 8:00 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner supervisor, Eddie Chan, can be reached on (571) 272-4162. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC central telephone number, 571-272-2100.

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13. In order to reduce pendency and avoid potential delays, Group 2100 is encouraging FAXing of responses to Office actions directly into **the Group at fax number: 571-273-8300**. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2100 will be promptly forward to the examiner.

A handwritten signature in black ink, appearing to read 'Henry W. H. Tsai', written in a cursive style.

HENRY W. H. TSAI
PRIMARY EXAMINER

September 14, 2005